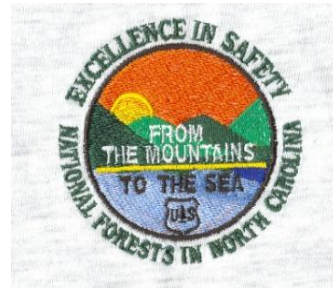


Grandfather Restoration Project

A Collaborative Forest Landscape Restoration Proposal

USDA Forest Service
National Forests in North Carolina

February 9, 2011



Executive Summary:

Dominant forest type(s): Oak –Hickory Forest, Pine-Oak/Heath, Acidic Cove Forest, Shortleaf Pine-Oak Forest, Rich Cove Forest

Total acreage of the landscape: 330,360 Total acreage to receive treatment: 41,685

Total number of NEPA ready acres: 8,954 Total number of acres in NEPA process: 32,731

Description of the most significant restoration needs and actions on the landscape:

Restoration of the natural fire regime to fire adapted vegetation to benefit T&E species, restore native forests and woodlands, benefit early successional wildlife species, and reduce wildfire costs and severity. Control non-native invasive plants to benefit T&E species at Linville Gorge and restore riparian vegetation at Wilson Creek Wild and Scenic River. Treat eastern and Carolina hemlock for hemlock wooly adelgid to maintain genetically and ecologically important hemlock forest in the face of a non-native pest.

Description of the highest priority desired outcomes of the project at the end of the 10 year period:

Increasing populations of fire dependent T&E species. Decreased coverage and abundance of non-native invasive plants at Linville Gorge, Wilson Creek, and across the project area. Decreased fuel loads and a change in fuel model on 36,260 acres of prescribed burns. Increasing populations of fire associated wildlife species. Five hundred acres of the highest priority hemlock forest protected and maintained.

Description of the most significant utilization opportunities linked to this project

Use of small diameter materials for specialty furniture and building products such as railings. Use of small diameter wood for firewood, pulp, and if a facility is available, bioenergy. Utilizing off-site species as saw timber. Utilizing white pine from restored plantations as saw timber, pulp, firewood, and specialty wood products.

Name of the National Forest, collaborative groups, and other major partner categories involved in project development:

Pisgah National Forest - Grandfather Ranger District, Southern Blue Ridge Fire Learning Network, NC Wildlife Resources Commission, The Nature Conservancy, WildLaw, Wild South, the Southern Appalachian Forest Coalition, Trout Unlimited, The Southern Forest Network, Land-of-Sky Regional Council, Western North Carolina Alliance

Describe the community benefit including number and types of jobs created.

Local community will benefit through reduced wildfire risk, improved wildlife habitat, increasing recreation opportunities and jobs created. Jobs created include implementation, monitoring and wood products totaling 12.6 full-time equivalent jobs

Total dollar amount requested in FY11 \$604,724 Total dollar amount requested for life of project \$4,547,622

Total dollar amount provided as Forest Service match in FY11 \$502,324

Total dollar amount provided as Forest Service match for life of project \$3,649,824

Total dollar amount provided in Partnership Match in FY11 \$36,000

Total dollar amount provided in Partnership Match for life of project \$76,000

Total in-kind amount provided in Partnership Match in FY11 \$59,700

Total in-kind amount provided in Partnership Match for life of project \$570,000

Time frame for the project (from start to finish) 10 years

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Section 1: Ecological, Social & Economic Context

Compiled by Josh Kelly - WildLaw, Ryan Jacobs – NC Wildlife Resources Commission, Gordon Warburton – NC Wildlife Resources Commission, Alyx Perry - Southern Forest Network, Erica Anderson -Land of Sky Regional Council, and Greg Phillips – FMO Grandfather Ranger District, Pisgah NF

1.1: Ecological Introduction

The Grandfather Project Area is situated on the Blue Ridge Escarpment at the eastern edge of the Southern Blue Ridge Physiographic Province, where the Blue Ridge Mountains descend into the Piedmont of North Carolina. The Blue Ridge Province is the most botanically diverse area of its size in the continental U.S. (Wofford 1989) and is also a region of renowned animal diversity. The landscape is characterized by the southwest to northeast trend of the Blue Ridge Mountains with the highest elevations occurring at the crest of the Blue Ridge Escarpment along the northern and western boundaries of the Project Area. Elevations range from 5,940 feet at the top of Grandfather Mountain to 1,073 feet on lower Wilson Creek. It is possible within the Project Area to traverse an elevation gradient over 4,000 vertical feet in less than 5 aerial miles. From the crest of the Escarpment south trending spur ridges descend into the Piedmont creating many steep gradient streams which cut deep gorges between the surrounding ridges.

National Forests in North Carolina have developed a model of the “Ecological Zones” of Nantahala and Pisgah National Forests to more accurately reflect the fine-scale vegetation patterns found in the Southern Appalachians (Simon et al., 2005, Simon 2008). The Ecological Zone Model uses environmental variables to predict the potential natural vegetation and site quality across the Nantahala and Pisgah National Forests at 10 x 10 meter pixel size. The Grandfather District contains 15 of the vegetation types represented in the Ecological Zone Model, including Spruce-Fir Forest, Northern Hardwoods Slope Forest, Northern Hardwoods Cove Forest, Alluvial Forest, Rich Cove Forest, Acidic Cove Forest, High Elevation Red Oak Forest, Mesic Oak-Hickory Forest, Dry-Mesic Oak-Hickory Forest, Mixed Oak/Heath, Chestnut Oak/Heath, Pine-Oak/Heath, Shortleaf Pine-Oak, and Shortleaf Pine-Oak/Heath. Encompassed within these 15 Ecological Zones are the applicable vegetation alliances of Nature Serve and the natural communities of the NC Natural Heritage Program. In this document, Ecological Zones will be used when discussing vegetation types (Nature Serve 2002, Schafale & Weakley 1990).

The present condition of forests within the Grandfather Project Area varies greatly with forest type and disturbance history. In general, mesic forests such as cove and northern hardwoods forests can be found in a range of conditions from relatively undisturbed with mixed age, diverse structure and an intact flora and fauna to highly departed from a reference condition. The later forests are typically even-aged, dominated by opportunistic tree species, have infestations of non-native invasive species, and have eastern hemlock populations that have either been extirpated or severely impacted due to hemlock woolly adelgid. Xeric forests which consist primarily of pine and oak dominated species are often extremely departed from the desired conditions and are comprised of a closed

canopy system and an understory with little diversity. These forest types have been significantly impacted by years of fire suppression and contain very few reference examples of the desired condition.

Table 1: Ecological Zones of the Grandfather Ranger District

Ecological Zone	Acres	Fire suppression	HWA	Even-aged	NNIS	% Departed*
Spruce Fir	4	N/A	N/A	N/A	Low	0
High Elevation Red Oak	1,426	Moderate	N/A	Moderate	Low	40
NH Cove	586	N/A	Moderate	High	Low	65
NH Slope	9	N/A	N/A	N/A	Low	0
Acidic Cove	41,599	N/A	High	High	Low	85
Rich Cove	12,373	N/A	Low	High	High	75
Mesic Oak-Hickory	76,196	Moderate	Low	High	Moderate	70
Chestnut Oak	1,722	High	N/A	Low	Moderate	50
Pine-Oak/Heath	44,386	High	N/A	Low	High	99
Dry-Mesic Oak-Hickory	453	High	N/A	Moderate	Low	80
Oak/Heath	883	Low	Low	Moderate	Low	40
Shortleaf-Oak	7,171	High	N/A	High	Moderate	99
Shortleaf-Oak/Heath	1,984	High	N/A	Moderate	Moderate	99
Alluvial Forest	1,685	N/A	Low	High	High	90
Grassy Bald	0	N/A	N/A	N/A	N/A	N/A

*Percentage of vegetation type departed from reference condition compiled from expert opinion. An Enhanced Conservation Action Plan will be facilitated by TNC in 2011 to identify more accurate figures for each vegetation type.

1.2 Historic Causes for Departure from Desired Condition

Historically, the Southern Blue Ridge was noted as having large areas of old growth forests interspersed with oak woodlands maintained by lightning fires and anthropogenic fires. (Wilson 1902, Pinchot & Ashe 1898, Barden 1997, Dellcourt and Dellcourt 2004). By the mid 1800's Native American populations were extirpated from the Southern Appalachians thus removing a powerful and influential ecological force from the system. Large keystone wildlife species such as elk, bison and the cougar further went the way of the American Indian. The Grandfather Ranger District was the site of the first purchase of National Forest Land under the Weeks Act that authorized the formation of the Eastern National Forests in 1911. Prior to USFS acquisition, many forest stands were heavily logged or "high-graded" of the most commercially valuable trees, leaving stands with altered species composition and physical structure. Initially, the most easily accessible and commercially valuable forests were logged at until nearly all of the forested areas were cut leaving mostly undesirable species. The impact of early logging coupled with wildfires sparked by the consequential railroads, imposed a level of disturbance far beyond a natural range of variation during the early years of the 20th Century. The subsequent years of fire suppression in conjunction with the excessive cutting events of

the early 1900's, have left most of the Grandfather Project Area with structurally impoverished forests which have a clumped aged class distribution (80-100 years old) lacking quality early successional habitat or an adequately developed mid story needed by many wildlife species. During the years of early European settlement many areas were farmed and grazed resulting in soil compaction and soil loss. A further catastrophe was the chestnut blight (*Cryphonectria parasitica*), which swept through the area in the 1920's and 1930's and decimated the most common and ecologically important tree in the region. Despite these disturbances, the steep terrain of the Blue Ridge Escarpment spared some large and notable areas of old-growth forest in the Project Area in locations such as Linville Gorge and Mackey Mountain.

The large scale disturbances wrought by heavy logging, chestnut blight and other major ecological changes (loss of keystone species, changes in soil, grazing, etc.) decreased age class diversity and physical structure both at the stand and forest level, while fire suppression has increased the abundance of mesophytic species such as yellow poplar, white pine, and red maple and decreased the abundance of yellow pines and oaks. The effects of fire suppression can be seen even in the few forests that escaped logging. In pine and oak forests it is generally noted that the stocking density of seedlings, saplings, shrubs and poles has greatly increased under U.S. Forest Service ownership, while yellow pines and several oak species are declining. The legacy of heavy logging and fire suppression has resulted in a landscape with large blocks of even-aged, mid-successional forest, little acreage of old-growth forests, declining disturbance-dependent, early successional wildlife species and declining fire-dependent plant species.

1.3 Fire Adapted Vegetation Types and Current Threats

Because of steep terrain, predominately southern aspect, relatively low precipitation (for the Blue Ridge), and low elevations, the Grandfather Project Area is one of the most pyrophytic (fire-loving) areas of the Blue Ridge Province. Ecological Zone modeling indicates that 69% of the Forest Service ownership in the Grandfather Project Area is fire adapted, and 27.8% is modeled as yellow pine forest, compared to a 6% average for Nantahala and Pisgah National Forests as a whole (Simon 2008). The effects of fire in the Blue Ridge Escarpment area were noted by Gifford Pinchot and W.W. Ashe in their 1898 document: "Timber Trees and Forests of North Carolina". These two pioneers of American forestry stated that along the Blue Ridge Escarpment and in the Lower Mountains, Table Mountain pine, shortleaf pine, and pitch pine forests made up approximately two-thirds of the landscape. Pinchot and Ashe noted that in Table Mountain pine forests, "[t]here is no underwood, and it is only occasionally that young trees are found, and these are for the most part stump or stool-shoots from trees the tops of which have been killed by the frequent fires which ravage these forests."

Table Mountain pine forests are included in the Pine-Oak/Heath Ecological Zone, so named because this zone is dominated by pines, oaks, and members of the heath family like blueberry, huckleberry, and mountain laurel. In the absence of frequent fire, evergreen shrubs of the heath family and species like red maple have increased dramatically compared to the earliest accounts, creating dense shade where grasses and

forbs previously thrived and leading to dangerous accumulations of fuel (Abrams). As a result, many rare, fire-dependent plant species are in decline in the Blue Ridge, habitat for woodland and grassland associated animals is rare, and wildfires in the past decade have burned with severity not seen since fires fueled by logging slash devastated the area in the early 1900's. The desired condition for the Pine-Oak/Heath and Shortleaf Pine Ecological Zones is a forest matrix that is one-third forest and two-thirds woodland. Of the 84,504 acres (56,613 on U.S. Forest Service Land) of Pine-Oak/Heath and Shortleaf Pine Forests modeled in the Project Area, fewer than 500 acres are estimated to be in a desired woodland condition.

At Linville Gorge Wilderness, the absence of fire is negatively impacting one of only two known populations of the Federally Listed mountain golden heather (*Hudsonia montana*) as well as another Federally Listed species, Heller's blazing star (*Liatris helleri*). Clumps of mountain golden heather burned in the Shortoff wildfire of 2007 increased in coverage by 200%. In contrast subpopulations surrounding the Chimneys and Table Rock that have not experienced fire for seven to eight years have decreased in numbers by 50% (Gary Kauffman, pers. comm.).

In the five Ecological Zones that support oak-hickory forests in the Project Area, totaling 126,616 modeled acres (79,802 acres on Forest Service land), fire is believed to influence and maintain the species diversity and forest structure. The lack of fire has led to increases in thin-barked, shade-tolerant mesophytic tree species including white pine, red maple, black birch, black gum, and yellow poplar and increased understory shade, which has led to a decreased oak component (Meir and Bratton 1996). There is ample evidence that fire is an important disturbance in upland oak forests that helps deep-rooted and fire-resistant oaks out compete other tree species (Abrams 1996, 1997). With the tragic loss of the Chestnut, oak masts (acorns) are vital in the life histories of many animals inhabiting the project area and the Southern Appalachians. Wildlife managers have serious concerns about the decline in mast production as the clumped age class of the current forest ages and oaks eventually senesce and cease producing acorns.

Fuel loads in fire adapted vegetation types are generally dangerously high in the Project Area. Waldrop et al. measured fuel loads at mixed oak/pine sites on the Blue Ridge Escarpment as 0.8-1.1 tons/acre of 1-hr fuels, 4.6-5.5 tons/acre of 10-hour fuels, 9.3-13.9 tons/acre of 100-hour fuels, and 33.2-43.3 tons/acre for 1000-hour fuels (2010). While these fuel loads are high, our goal in the Grandfather Project centers more on changing the fuel model than the fuel load. Fire ecologists and fire managers have noted that existing fuel models do not satisfactorily describe the fire suppressed forests of the Southern Blue Ridge with a highly flammable shrub layer (Waldroup 2007). Most yellow pine forests in the Project Area would be best described as Fuel Model 6: fire propagated through a highly flammable shrub layer. Fuel Model 2 is the desired condition: fire carried through grasses and forbs (Anderson 1982)

In addition to fire exclusion, non-native invasive plants (NNIPs) are increasing in the dry forest types of the Grandfather Project Area. While more species of NNIPs threaten mesic forests, dry forests are compromised by princess tree (*Paulownia tomentosa*), tree-

of-heaven (*Ailanthus altissima*), and plume grass (*Miscanthus sinensis*). These fire-tolerant species are particularly troublesome at Linville Gorge, where they compete with rare plants and rugged terrain and Wilderness regulations make controlling them extremely challenging.

1.4 Mesic Vegetation Types and Current Threats

The six Ecological Zones that support Spruce Fir, Northern Hardwoods, Alluvial Forest and Cove Forests, totaling 119,481 acres (58,786 on Forest Service land), are not considered fire-adapted by the [Southern Blue Ridge Fire Learning Network](#) (FLN 2009). Rich cove forests in particular are known for high botanical diversity and high productivity. The biggest current threat to mesic forests, in particular acidic cove and eastern hemlock forests is hemlock woolly adelgid (HWA), *Adelgis tsugae*, a non-native, aphid-like insect that has caused the mortality of millions of eastern hemlocks in the Grandfather Project Area, leading to a loss of evergreen cover, increased stream temperatures, and a host of other ecological issues. Non-native invasive plants are another looming concern in the more open Rich Cove and Northern Hardwood Forests, where at least 16 species have been identified as invading and impacting the native vegetation (USDA Forest Service 2009).

While eastern hemlocks (*Tsuga canadensis*) have been devastated by HWA, Carolina hemlock (*Tsuga caroliniana*), endemic to the Southern Appalachians, is more resistant to HWA. As a result many groves of trees are still alive. All three of the three rare natural communities where Carolina hemlock is the keystone species occur within the Grandfather Project Area. While significant mortality of Carolina hemlock has occurred due to HWA, many outstanding groves can still be saved, and the Grandfather Project Area contains the majority of the Carolina hemlocks throughout its range, including 36 examples of the rare Carolina Hemlock Bluff natural community (WildLaw, unpublished data).

1.5 Socio-Economic Conditions

Western NC is a region traditionally dominated by timber- and manufacturing-dependent communities, and has been especially hard hit by the recession. The NC Rural Center recently noted that “The recession that began in December 2007 hit especially hard in western North Carolina, where manufacturing makes up a large part of the employment base. Eighteen counties in the foothills and mountains have lost more than 10 percent of their jobs” (Rural Routes, Summer/Fall 2010). It is also notable that the far western part of the state is one of two regions in the state (along with the coast) where increases in poverty rates have been acute. The greatest current socio-economic threat to the region is high unemployment. The [North Carolina Department of Commerce](#) lists four of the seven counties in the project area among the most economically distressed in the state. According to the [North Carolina Employment Securities Commission](#), all seven counties in the project area have unemployment rates above 9%, with two over 12%.

While our region still maintains some primary and secondary mills, a great deal of the region's manufacturing industry has moved overseas or become concentrated within a smaller number of businesses. As a result, growth in local employment in wood products has become somewhat stagnated even as timber harvests have increased. From the early 1980's to early 2000's, timber harvesting in North Carolina increased 60% by volume, but employment in the mill sector increased by only 5%, and the state lost 49% of its primary sawmills, veneer mills, pulp mills, and composite panel mills. There were 168 U.S. furniture plant closures between 2000 and 2003 with closures focused in NC (43%).

The region is also home to many small enterprises, such as woodworkers and portable mills, which provide forestry services and manufacture value-added wood products. Smaller enterprises are often better positioned to create value-added and niche market opportunities for small diameter and low-quality timber, alternative species, "character" woods, and underutilized materials.

There are many existing small businesses in Western North Carolina (WNC) that utilize and depend upon small diameter wood products, invasive species, and non-timber forest products. For example, the WNC Forest Products Cooperative Marketing Project (WNC Forest Products) is currently assisting fourteen of these businesses expand and diversify to further develop the regional forest-based industry. WNC Forest Products resulted from a \$1.974 million ARRA grant through the USDA Forest Service's Southern Research Station. From December 3, 2009 to January 1, 2011, \$700,000 has been spent to **create or sustain over 110 jobs in WNC**, resulting in 37.5 full-time equivalent (FTE) positions. There is growing demand for locally sourced timber and non-timber forest products for a diverse forest-based economy. Herbalists, forest food producers and harvesters – including mushroom growers, artisans, handcrafters, woodworkers, furniture manufacturers, and architectural designers are all looking to locally sourced wood products for materials to expand their businesses. Please visit the WNC Forest Products website for more information on this project: www.wncforestproducts.wordpress.com

Aside from the timber industry, the Grandfather Project Area also has other effects on the local economy. According to a study commissioned by collaborating partner Wild South, tourism that is dependent on outdoor recreation such as hunting, fishing, hiking, mountain biking, and scenic driving accounted for over \$312 million of economic activity and 4,190 jobs in the portion of the Project Area including Avery, Caldwell, and Watauga counties (Reference). A 2006 study by the North Carolina Wildlife Resources Commission reinforces these findings, noting that 19% of hunters and 52% of trout anglers which use public lands in North Carolina frequent the Pisgah National Forest. According to the survey report "The 2006 Economic Benefits of Hunting, Fishing and Wildlife Watching in NC" published by the North Carolina Wildlife Resources Commission in 2008, 3.4 million residents and non-residents participated in some form of fish and wildlife related recreation in North Carolina and spent \$2.62 billion in retail sales. These activities also created 45,224 jobs in the state and generated \$1.26 billion in salaries and wages, having a total economic effect on the state estimated at \$4.3 billion. Of that \$4.3 billion, over \$856 million was generated solely through hunting. Trout fishing and wildlife viewing were also included in "The 2006 Economic Benefits of

Hunting, Fishing and Wildlife Watching in NC” report. Trout fishing in the state generated a total economic output of \$224,990,738 and wildlife viewing contributing to a total of \$1,525,765,137.

In addition to its recreational and commercial importance, the Project Area encompasses the headwaters of the Catawba River, the most densely populated river basin in North Carolina. Over 1.4 million people live in the Catawba Watershed in North Carolina. The Catawba feeds eight hydroelectric reservoirs in North and South Carolina and provides water for hundreds of thousands of North Carolinians.

Fire suppression within the Grandfather Project Areas has had major socio-economic impacts as well. Past fire suppression in conjunction with climate change has led to dangerous fuel loads which have increased wildfire frequency and severity. Grandfather Ranger District FMO Greg Phillips has observed that for the first seven years of the last decade the district had averaged three lightning ignitions annually. However, in the past four years the district has averaged six lighting ignitions per year. The cost of fighting wildfires, human or lightning ignited, especially in drought years as were in 2007 and 2008, were very high. Some examples of recent wildfire suppression costs are: 2007 Pinnacle (approximately 2,000 acres) – \$1.8 M, 2007 Linville Complex of Shortoff (approximately 5,500 acres) and Dobson Knob (approximately 850 acres) – \$6.9M, and 2008 Sunrise (approximately 2,200 acres) – \$1.7M. High fuel accumulations and dry, hot weather resulted in very high fire danger and severity on these fires. On the 2007 Shortoff Fire, 55% of the 5,500-acre fire was a stand replacement fire resulting in exposed mineral soil over thousands of acres.

Another important socio-economic factor to consider is the over 124,000 acres of the Grandfather Ranger District is considered Wildland Urban Interface. Loss of forest land to development in Western North Carolina is occurring at one of the fastest rates in the nation, a fact which was featured in “National Forests on the Edge: Development Pressures on America’s National Forests” (Stein et al. 2007). To address wildfire concerns along the Wildland Urban Interface, the NC Division of Forest Resources has received a \$4.6 million [ARRA](#) grant to complete Community Wildfire Protection Plans in North Carolina. These funds have been used to write Community Protection Plans for 15 rural fire districts and three municipalities totaling over 262,000 acres within and surrounding the project area (see attached maps). Various private landowners are also involved with NC DFR and the Grandfather Ranger District’s efforts to increase fire safety by participating in Community Protection Plans and Community Wildfire Protection Plans.

Section 2: Summary Landscape Strategy

Josh Kelly – WildLaw, Ryan Jacobs – NC WRC

The Landscape Strategy for the Grandfather Project is based on three years of collaboration by local stakeholders to develop restoration priorities for Nantahala-Pisgah National Forests. The priorities of the Nantahala-Pisgah Restoration Working Group are:

1. Restore fire adapted vegetation, benefit wildlife and T&E species, and reduce wildfire risks through increased fire management.
2. Improve wildlife habitat and forest composition through silviculture in degraded stands.
3. Address invasive pest problems by preserving the most important hemlock forests
4. Maintain viable native plant communities by treating the most sensitive areas for NNIPs.
5. Restore riparian vegetation, remove fish passage barriers, reduce sedimentation and reconnect streams to their flood plains to benefit water quality and aquatic ecology.

All of these priorities are addressed in the Proposed Treatments section. More information about ecological restoration priorities on Nantahala-Pisgah National Forest can be found [here](#).

In order to maximize the benefit of limited resources for prescribed fire, the Grandfather Ranger District in association with other collaborators through the Fire Learning Network, has completed an ecological prioritization model for the potential prescribed fire units on the District (see section 3.3: Fire Management). This model is being used in conjunction with estimates of logistical cost to maximize both the ecological and economic benefits of burn units. Focusing solely on ecological restoration, burn units with the highest amount of woodland-suitable pine and oak forests and the most important fire dependent rare species score the highest. These values are then overlapped with logistical considerations such as WUI protection and the feasibility of fire control to choose the acres most in need of treatment. Currently, the district has the budget and capacity to accomplish 2,000 acres of prescribed fire annually. The goal of the Grandfather Collaborative is to more than triple that figure with CFLR funding to over 6,500 acres annually, largely through hiring contractors and Schenk Job Corp members.

NNIP treatments are being concentrated in two of the areas of greatest ecological and social value on the Grandfather Ranger District: Linville Gorge Wilderness and Wilson Creek Wild and Scenic River. There are sufficient allocations of funds from ARRA, FS allocations, and partner matches to have a huge positive impact with these treatments. Control of NNIPs will be an ongoing activity throughout Pisgah National Forest. However, there is reason to believe that acting decisively in these critical locations will have the greatest positive impact and reduce the costs of future treatments.

Mechanical vegetation treatments are addressed in the two current and upcoming Analysis Areas on the Grandfather District; a third Analysis Area is likely in the time frame of this CFLR funding request but has not yet been identified. Mechanical treatments will focus on stands that would help to improve age structure (even aged), species composition, and habitat structure for a variety of wildlife species in a given area

Hemlock preservation will be concentrated in the best remaining occurrences of hemlock forest on the District. The 2005 Hemlock Woolly Adelgid EA (Nantahala-Pisgah

National Forest) selected sites based on landscape position, elevation, rare species habitat, and other factors. The 2010 HWA EA added additional sites with the help of the Hemlock Working Group, a collaborative group of State, Federal, and non-profit organizations working to protect hemlocks from hemlock wooly adelgid.

The North Carolina Chapter of the Nature Conservancy has offered to facilitate an Enhanced Conservation Action Plan for the Grandfather Project (ECAP). A web page with a longer Summary Landscape Strategy is being developed. The ECAP process will help to refine the strategy for all of these areas further identifying the vegetation types most in need of active restoration.

The long version of the Summary Landscape Strategy can be found [here](#).

Section 3: Proposed Treatments

Lorie Stroup – Fisheries Biologist Pisgah NF, Ryan Jacobs – NC WRC, Gordon Warburton – NC WRC, Bob Gale – Western NC Alliance, Hugh Irwin – Southern Appalachian Forest Coalition, Josh Kelly – WildLaw, Margit Bucher - TNC

3.1: Project Boundaries

The boundary for the Grandfather Project Area was set by including all parts of the proclamation boundary for the Grandfather Ranger District east of the Continental Divide separating the Tennessee/Ohio/Mississippi river system from streams flowing into the Atlantic Basin. Over 100,000 acres of the proclamation boundary is north and west of the Continental Divide and contains no Forest Service land. The Project Area totals 330,360 acres, of which 58% (192,210 acres) are U.S. Forest Service lands. Excluding roads, wildlife openings, water bodies, and rock outcrops, approximately 174,911 acres (53%) of the Project Area is forested National Forest System lands. Other conservation land owners within the project area include: 5,573 acres of Blue Ridge Parkway National Park Service land, 3,757 acres of North Carolina State Park land, 3,319 acres of North Carolina Wildlife Resources Commission land, 458 acres of North Carolina Division of Forest Resources land, 2,215 acres of other State lands, 3,612 acres of private lands held in conservation easement, and approximately 119,192 acres of other private lands.

Collaboration with the Blue Ridge Parkway, NC State Parks, the NC Division of Forest Resources, The Nature Conservancy, and the NC Wildlife Resources Commission – the major conservation land owners in the Project Area – is well established (See Section 5.1). All five are members of the Southern Blue Ridge Fire Learning Network and have collaborated on controlled burns in the past. The Foothills Conservancy is an active local land trust that has helped to protect over 800 acres of land in the Wilson Creek watershed and a partner in efforts to control non-native plants on Wilson Creek.

3.2: Treatments Overview

Over a 10-year period the Grandfather Collaborative will improve the condition of 36,795 acres of pine and oak forests through prescribed fire, including mechanical thinning and re-introduction of shortleaf pine where opportunities exist. Fire will also be used to benefit Threatened and Endangered species and lower wildfire severity and fire suppression costs on those acres. In the same period, the collaborative group will improve species composition and structure on 1850 acres of upland forests through timber stand improvements, biomass thinning, and timbersales removing white pine, red maple, yellow poplar, and other mesophytic species from oak-hickory and yellow pine Ecological Zones. These silvicultural activities in combination with prescribed fire will greatly benefit many declining disturbance-dependent wildlife species as well as promote adequate advanced regeneration of oak in these treatment areas. To promote and maintain native species, 2740 acres will be treated for non-native invasive plants (NNIPs) at and surrounding Linville Gorge Wilderness, Wilson Creek Wild and Scenic River, and other locations on public land. These treatments will complement treatments on State and private lands along Wilson Creek. This will also include treatment of 540 acres of eastern and Carolina hemlock for hemlock woolly adelgid within the first two years of the project and to be maintained indefinitely. Actions to restore streams, watersheds, and hydrologic function include bank stabilizations, species reintroduction, removing artificial fish barriers, non-native invasive plant removal, and enhancement of streamside vegetation on a total of 16 miles of streams in the Project Area.

Table 2: Treatment Activities 2011-2020

Treatment	Units Treated without CFLRP Funding	Units Treated with CFLRP Funding
Prescribed Fire	2,000 acres/year 14,000 acres 2011-2020*	6,507 acres/year 36,795 acres 2011-2020*
Hemlock Soil Injection	100 acres/year 2011-2012 240 acres 2011-2020	250 acre/year 2011-2012 540 acres 2011-2020
NNIP Control	809 acres	2740 acres
Streamside Vegetation Restoration/Enhancement	11 miles**	16 miles**
Artificial Fish Barriers Removed	3	3
Silvicultural Restoration	450 acres 2011-2020	450 acres 2011-2020
Timber Stand Improvement	800 acres 2011-2020	1200 acres 2011-2020
Fuels Thinnings	0	200 acres 2015-2017
Plantations Restored	0	Up to 500 acres***

*Burn units on a restoration schedule will be burned a minimum of twice per decade but ideally 3 times, those on a maintenance schedule will be burned at least once per 7-10 years.

**Includes NNIP treatments.

*** Over 1,300 acres of white pine plantations have been identified as restoration opportunities. The collaborative group has not reached consensus on this opportunity and it is not calculated in the Utilization Plan or Benefits to Local Economies Section.

3.3: Fire Management

Ecological Zone modeling reveals that approximately 69% of the forests on the Grandfather Ranger District are fire adapted. As previously mentioned, in an effort to use prescribed fire as effectively as possible, the Southern Blue Ridge Fire Learning Network comprised a team of members from five agencies, to complete a prioritization model for the Grandfather Ranger District. The team's first task was to identify all potential prescribed fire units, which were limited by the feasibility of containing fires within control lines based on the expert opinions of the group. The Network covered the entire district and identified 42 potential burn units totaling 95,178 acres. Each unit was then analyzed for the acreage of yellow pine forest, fire-adapted oak forest, globally rare fire-adapted species, State Listed fire-adapted species, occurrences of high-quality fire-adapted forest types tracked by the N.C. Natural Heritage Program, and the acreage of maintained wildlife openings that the Network would like to manage as savannahs. An equation was developed to score each variable and an ecological score was then assigned to each burn unit, indicating its ecological priority for prescribed fire.

The findings revealed that the three highest scoring burn units overlap Linville Gorge Wilderness, which is a difficult place to burn from a logistical standpoint. The importance of managing fire in Linville Gorge has been recognized by National Forests in North Carolina, and money has been allocated for an Environmental Assessment for controlling NNIPs and prescribed burning in the Wilderness. These two activities are of central importance to a restoration strategy in the Grandfather Project Area.

A dendrochronology study on Linville Mountain in the central portion of the Project Area documented a historical fire return interval of seven years dating back to 1701 in a Pine-Oak/Heath Forest (Flatly & Lafon 2010). Based on these data, the desired fire return interval for each prescribed fire unit is 7 years. However, the restoration return interval is more frequent than the maintenance interval and 2-3 burns are usually required to arrive at desired condition at similar sites in the region (Waldroup et al. 2010). Currently the Grandfather Ranger District has 8,560 acres of NEPA-approved burns spanning National Forest and NC WRC lands, some of which have been burned two or more times and are approaching the desired condition. In FY 2011 NEPA approval for 18,128 acres of additional burns is being sought and NEPA approval for an additional 10,107 acres of prescribed fire will be sought in the Linville Fire and Invasive Plant EA. Burning the 28,255 acres of new units at a restoration interval of twice per decade and the 8,560 acres of current burn units at a maintenance level will require burning an average of 6,507 acres a year (See Attachment A).

The desired condition for the Pine-Oak/Heath and Shortleaf Pine Ecological Zones is a forest matrix that is one-third forest and two-thirds woodland, where woodlands have between 40%-60% canopy closure, an open midstory and shrub layer with few evergreen shrubs, and 35-90% herbaceous groundcover dominated by grass species. Most Pine-Oak/Heath forests today have a closed canopy with a dense evergreen shrub layer composed of mountain laurel (*Kalmia latifolia*) and *Rhododendron* and below 5% herbaceous groundcover. Of the 84,504 acres (56,613 on U.S. Forest Service Land) of Pine-Oak/Heath and Shortleaf Pine Forest modeled in the Project Area, fewer than 500

acres are estimated to be in a desired woodland condition. Success in prescribed burning will be measured in the number of acres of woodlands restored and acres on which Fuel Model 6 is transitioned to Fuel Model 2 (Anderson 1982). Success will further be measured by monitoring population trends of fire-associated wildlife and T&E species within burn units.

The North Carolina Department of Natural Resources has conducted an assessment of expected changes in precipitation patterns, frequency of severe storms and droughts as result of climate change and how ecosystem may respond to these changes. Pine and oak forests are likely to persist through these changes and would be more resilient to drought and fires if their structure is restored to the more open conditions described in historical records.

Live tree carbon stocks in today's fire-suppressed forests are 2.3 times greater than historic forest carbon stocks. (Hurteau, M.D., G.W. Koch, and B.A. Hungate. 2008). Burning and thinning will result in some reduction of live carbon stock and produce a forest structure that is less susceptible to severe fires and hence more resilient with more stable long term carbon storage.

3.4: Non-Native Invasive Plants (NNIPs)

Non-native invasive plant species (NNIPs) are increasing in Linville Gorge Wilderness and throughout the Project Area. A forest-wide invasives EA covers all Forest Service lands outside of Wilderness and an EA for NNIPs and fire management is underway for Linville Gorge. While at least 16 invasive species will receive treatment over the 10-year period of the project, three will receive special attention: princess tree, plume grass, and Japanese knotweed. Princess tree (*Pauwlonia tomentosa*) and plume grass (*Miscanthus sinensis*) are aggressively invading rock outcrop and woodland habitats and competing with rare and sensitive species. Populations of princess tree and plume grass tend to increase after fires and to prevent their spread they will be controlled both inside and in areas adjacent to Linville Gorge. All roads, trails, and fire lines within the Gorge and surrounding burn units will be monitored for NNIPs, and any populations that are discovered will be treated. Following burns this protocol will be repeated. Over a 10-year period more than 2,000 acres in and around the Linville Gorge Wilderness will be treated for NNIPs and hundreds more acres will be treated elsewhere on National Forest Land.

At Wilson Creek Wild and Scenic River Japanese knotweed (*Reynoutria japonica*) has invaded approximately 15 linear miles of the riparian zone of Wilson Creek and its tributaries and is displacing native vegetation and altering stream ecology. A strong partnership with Friends of Wilson Creek, The Nature Conservancy, Foothills Conservancy, and NC Wildlife Resources Commission is in place to address Japanese knotweed on federal, state, and private lands.

3.5: Silvicultural Treatments

The Roses Creek Project is a NEPA-ready project and a model for the types of silvicultural activities that will occur as part of the Grandfather CFLR Project. The 250 acres of stands treated have poor structural and compositional conditions and fall into the Shortleaf Pine and Dry-Mesic Oak-Hickory Ecological Zones. White pine makes up the majority of the volume in these stands, which are outside the Cove Forest Ecological Zones in which it was dominant historically (Pinchot & Ashe 1898). White pine, Virginia pine, red maple, yellow poplar, and scarlet oak will be harvested, while white oak, chestnut oak, pitch pine, shortleaf pine, and Table Mountain pine will be retained. Several of the harvested stands and a 2,300-acre backcountry area will be treated with prescribed fire. Shortleaf pine will be planted on 130 acres. The treated stands will have a desired species composition of long-lived, fire-tolerant oaks and pines with a multi-aged structure that provides habitat for multiple guilds of wildlife species. The upcoming Headquarters Mountain Project will be modeled after the Roses Creek Project and expand the range of treatments to include mechanical thinning of small diameter mountain laurel, red maple, scarlet oak, and other species in sites appropriate for woodland restoration.

3.6: Riparian Treatments and Stream Restoration

Eastern hemlock (*Tsuga canadensis* (L.) Carr) is a principal riparian and cove canopy species in the southern Appalachian Mountains, providing critical habitat for birds and other animals and shading streams to maintain cool water temperatures required by trout and other aquatic organisms. While today many stands of hemlocks are being saved from HWA, these efforts are not sufficient to avoid the ecological damage that can occur due to widespread hemlock mortality. If HWA-induced eastern hemlock mortality alters hydrologic function, land managers will be challenged to develop management strategies that restore function or mitigate impacts (Ford & Vose 2007).

To mitigate the loss of hemlocks, the National Forests in North Carolina (NFsNC) are identifying opportunities to enhance riparian vegetation and restore stream habitat. For example, there is an active riparian restoration project at Baldwin Fields Branch on the Pisgah Ranger District focusing on the thinning of riparian rhododendron to promote the growth of native vegetation that is more beneficial to the stream's health and hydrologic function. Similar opportunities exist across the Grandfather Ranger District, and while several projects have aspects of planning complete (see below), more intensive inventories are necessary to properly identify specific areas for riparian and stream restoration.

As part of the Roses Creek Project, riparian enhancements will include the reconnection of the stream with the floodplain to avoid future slope failures and the re-establishment of native riparian vegetation for bank stability and shade. There are also opportunities to utilize diseased hemlocks to provide habitat for native fish and aquatic invertebrates. Approximately 1 mile of habitat for fish and aquatic invertebrates will be enhanced and restored through the enhancement of native vegetation and elimination of chronic sediment sources.

Additionally, NEPA decisions have been signed and project design (engineering and hydrologic) is complete for other projects on the Grandfather Ranger District that will benefit riparian and aquatic resources. A culvert replacement project on Thorpes Creek within the Wilson Creek drainage will provide passage for native fish species and restore hydrologic function to approximately 1.5 miles of stream.

3.7: Hemlock Preservation

The National Forests in NC reassessed and revamped its Hemlock Conservation Plan in 2010 to incorporate additional conservation areas and include more Carolina hemlock sites. The Forest Service has initiated and sponsored a Hemlock Working Group to bring additional focus, expertise, and resources to this effort. This assessment revealed sites in a variety of conditions, including some sites that are no longer viable. However, additional sites have been located.

The Grandfather District is particularly important in the Hemlock Conservation Plan as it forms the center of distribution of the endemic Carolina hemlock. There was insufficient Carolina hemlock sites incorporated into the original Hemlock Conservation Plan. In addition, many of the sites originally identified as Carolina hemlock turned out upon field examination to be the more widely distributed Eastern hemlock. Provisions have been made in the updated conservation plan for adding additional Carolina hemlock sites, and surveys have identified additional Carolina hemlock sites in relatively good condition. These Carolina hemlock sites are a high priority for treatment in 2010 – 2011 under the revised Hemlock Conservation Plan.

In FY 2011, 390 Carolina hemlocks on approximately 21 acres have been treated for HWA on the Grandfather District. The importance of the Carolina hemlock population in the Grandfather Project Area demands that more sites be treated and Pisgah National Forest and its partners are planning to treat an additional 500 acres over the next two years in the Project Area. A part-time crew of four workers has been hired to accomplish this goal, which will ensure genetic survival of eastern and Carolina hemlock and leave some ecologically functioning stands.

Section 4: Collaboration and Multi-Party Monitoring

4.1: History of Collaboration

The Grandfather Restoration Collaborative is made up of a diverse group of interested parties. Each group has a long history of working independently with the Forest Service. The recent Forest Service emphasis on ecological restoration and collaboration has succeeded in bring these various groups in closer contact; the most recent evolution of that contact and collaboration being this proposal. Collaboration has increased incrementally since a series of meetings held by Region 8 (2007 & 2010) and National Forests in North Carolina (2008). As a result of these meetings, National Forests in North Carolina initiated the Nantahala-Pisgah Restoration Steering Team to help address

restoration needs and resolve conflicts between interest groups. The Restoration Steering Team meets on a bi-monthly basis.

The Blue Ridge Fire Learning Network is a collaborative group that has been meeting since 2006. Members include four National Forests, many state agencies, and several NGOs. A focus of the Blue Ridge Fire Learning Network has been to identify which forest communities benefit from fire and those that do not and to document vegetation changes at demonstration burns in forest communities that are believed to benefit from fire. The monitoring results of these demonstration burns allow FLN members to refine their goals and methods when managing fire. In contrast to other parts of the Southern Appalachians where many environmental groups oppose fire as management tool, the success of the Fire Learning Network in achieving consensus in North Carolina can be seen in the number of organizations contributing to this proposal.

Successful collaborations of group members include the Roses Creek Project (USFS, WildLaw, Southern Appalachian Forest Coalition, NC Wildlife Resources Commission), the Mulberry/Globe Stewardship Project (USFS, Wild South, Southern Environmental Law Center, National Wild Turkey Federation, NC Wildlife Resources Commission), the Lost Bear Prescribed Burn (USFS, Blue Ridge Parkway, FLN), and the Lake James Prescribed Burn (USFS, NC Wildlife Resources Commission, FLN).

4.2: The Grandfather Restoration Collaborative

The Grandfather Restoration Collaborative is a newly formed group that includes members of the Nantahala-Pisgah Restoration Steering Team and additional members. All groups that frequently contribute to management decisions on the Grandfather District were invited to participate in this proposal by email. Groups that have chosen not to participate in the development of the proposal were included when drafts were circulated. Although there have been no objections to the proposal from members of the collaborative, there has been some discussions concerning reference conditions and some specific treatment details. However, all collaborative participants have approved the treatment goals and strategies of this proposal, and have come to a consensus in the course of its development.

For initial membership in the collaborative group, all that is required is to sign the letter of commitment in Attachment D. Constituents of the group plan to meet quarterly to track the progress of projects and address any concerns. Groups signing on to the Grandfather Project include: NC Wildlife Resources Commission, NC Division of Forest Resources, The National Wild Turkey Federation, Southern Forest Network, The Southern Appalachian Forest Coalition, The Nature Conservancy, Trout Unlimited, Western North Carolina Alliance, Wild South, and WildLaw. Membership in the collaborative group after this proposal is accepted requires only that a group requests membership.

Moving forward, the Grandfather Restoration Collaborative will hold to a consensus based decision making process when possible. If disagreements or concerns arise about

particular aspects of the project, time will be taken to address those concerns and arrive at a consensus solution. Actions that achieve consensus will move forward while those that do not will be negotiated until consensus is achieved. If consensus can not be achieved, the group will revert to majority rule. The Grandfather Restoration Collaborative pledges that all actions will be consistent with Title IV of the Omnibus Public Lands Act of 2009.

4.3: Multi-party Monitoring

Collaboration to collect monitoring data is very important to this proposal. Ten percent of the CFLR funding request will be dedicated to inventory and monitoring annually. Monitoring plots for treatments will be installed by contractors, university students and volunteers. To ensure that goals regarding reducing fuel loads and restoring vegetation structure and composition are met, the monitoring protocols of the Fire Learning Network will be used on no less than ¼ of the proposed prescribed fire units and are already in place at the Lost Bear and Lake James units. For the remainder of fires U.S. Forest Service monitoring standards will be employed. Pisgah National Forest has established protocols for measuring the efficiency of non-native invasive treatments, which will be adopted for this project. Like wise, water quality data are also collected by Pisgah National Forest and fish and macroinvertebrate surveys will be done on streams receiving restoration by the NC WRC Fisheries Division. The effects of fire and other vegetation management on wildlife species will be monitored by the NCWRC, the US Forest Service and contractors. No decisions have been made regarding the type of monitoring to be employed for mechanical vegetation treatments. The final decision on the method of vegetation monitoring for mechanical treatments will be made by the collaborative group in 2011. Measures of success for each restoration action have been determined and are listed in the Summary Landscape Strategy.

Several collaborators have offered monitoring as an in-kind match. The Fire Learning Network is currently involved with long-term monitoring of prescribed fires, which will continue and expand under this project. WildLaw has offered its Staff Biologist and a trained intern for 300 hours of monitoring per year. Other groups, such as Friends of Wilson Creek, Foothills Conservancy, and Western North Carolina Alliance have offered to assist with NNIP treatments and monitoring. Undecided monitoring issues such as monitoring silvicultural treatments and socio-economic monitoring will be decided in the ECAP process later in 2011. The ECAP will help determine the placement, density and methodology of monitoring activities. During the ECAP process, group members will meet monthly, afterwards the group will meet quarterly.

Section 5: Utilization

Matt Keyes – Pisgah Zone TMO

The Grandfather Ranger District of the Pisgah National Forest has access to existing timber industry facilities to process sawtimber, pulpwood, and biomass byproducts created by forest restoration activities. In FY 2011 the Grandfather Ranger District

provided 9,863 CCF of sawtimber and pulpwood to local industries through the Mulberry Globe stewardship agreement with the National Wild Turkey Federation.

Restoration objectives described in this proposal will drive the amount of sawtimber and pulpwood produced by the Roses Creek project. Restoration activities will include harvesting of species such as eastern white pine, yellow poplar, and low grade hardwoods in order to reestablish fire-adapted species such as oaks and southern yellow pines. Harvested products will largely include white pine and hardwood sawtimber (primarily 10-24 inches in diameter) and pulpwood (7-10 inches in diameter). Sawtimber byproducts (unutilized material) are utilized as biomass.

In FY 2012-2014 restoration activities for the Roses Creek project are expected to provide approximately 3,500 CCF in sawtimber and 1,500 CCF in pulpwood. The Roses Creek project will be implemented through stewardship contracting, and the volume of sawtimber and pulpwood will result from approximately 250 acres of thinning and regeneration harvesting. Sawtimber and pulpwood from the Roses Creek project has an estimated pond value of \$252,000. Approximately \$121,000 will be available after road construction, logging, and hauling costs to accomplish other restoration activities through stewardship (goods for services).

Analysis has been initiated for the Headquarters project which is also part of this proposal. The Headquarters project is expected to provide 5,000 CCF in sawtimber and pulpwood in FY 2015-2017. CFLR funding will pay for trial thinning treatments in xeric stands and make additional 1,200 CCF of wood available to biomass, pulpwood, firewood, and niche market manufacturers. Sawtimber and pulpwood from the Headquarters project are anticipated to have a pond value of approximately \$200,000. The Headquarters project will also be implemented through stewardship contracting, and the value of the timber products removed will be available to accomplish restoration activities.

Existing local timber industry facilities include but are not limited to:

- Columbia Forest Products (yellow poplar plywood and veneer logs)
- Parton Lumber Company (white pine, yellow pine, and hardwood sawlogs)
- WNC Pallet (hardwood and softwood sawlogs, including low grade species)
- Bristol Industries (pulpwood – all species, down to 3” small-end diameter)
- Appalachian Designs (specialty railings and furniture from small diameter roundwood)
- Green River Forest Products (kiln dried fire wood)
- Canton Hardwoods (saw logs)

- Edwards Wood Products (white pine, yellow pine, and hardwood sawlogs)

In addition to these existing facilities, the Land of Sky Regional Council, located in Western North Carolina, received a \$1.9 million ARRA grant in December of 2009 to generate jobs for unemployed and under-employed forest products workers through improved marketing and production methods. This is expected to result in growth in niche markets which will create additional demand for and capacity to utilize small diameter trees from the Grandfather District. The District will work with the Council to provide small diameter trees for these emerging niche markets, and continue to provide opportunities for firewood, post and pole utilization of small diameter material to help achieve restoration goals.

Section 6: Benefits to the local economy

The local economy will benefit immensely from increased ecological restoration of the Grandfather Ranger District. The value of the area for wildlife viewing, scenic driving, hunting, fishing, hiking and other forms of outdoor recreation is discussed in detail in Section 1, and ecological restoration activities are expected to increase these values and the revenues from them. Employment from implementation, monitoring, and wood products is expected to provide 12.6 jobs annually and increase the capacity of the labor force of the region to accomplish ecological restoration activities such as non-native invasive species control, prescribed fire, timber stand improvements and biomass thinning (See Attachment E). Contracts awarded using CFLR funding will consider best value with local economic benefit being the most important criterion for selection. Mechanisms for carrying out work will include stewardship contracting, force accounts, and service agreements. Several of the hires for prescribed fire and forestry activities as a result of CFLR funding will come from the Schenk Job Corps that provides job training for young adults.

Section 7: Funding Plan

Over the course of CFLR funding, the project will strategically allocate funds to maximize impacts. Funding for prescribed fire will be essentially even over the 10 year period to establish and maintain a regular work flow, with some increases in efficiency and capacity expected by the end of the project. Other activities, such as inventory and monitoring, non-native invasive plant control, and hemlock treatments have a higher budget at the commencement of the project and declining budgets afterwards.

The need for immediate action in regards to hemlock is clear as many stands face mortality in the short term if not treated in the first two years of the project. Staggered maintenance treatments can be accomplished after the first treatments eradicate hemlock wooly adelgid and increase the vigor of treated trees. The situation with non-native invasives plants (NNIPs) is similar, in that cost savings can be achieved by treating NNIPs early, with declining costs achieved as NNIP populations are reduced.

Costs for inventory and monitoring are expected to be highest in the initial years of the project because of the value of installing all inventory and monitoring plots early in the process. After the installation of plots, data can be collected in a staggered fashion in coordination with treatments. The budget for inventory and monitoring totals \$526,000 including partner in-kind matches for the duration of CFLR funding. This figure is seen as necessary to accomplish adaptive management and to adequately report the ecological and economic effects of the project.

Attachment A: Projected Accomplishments Table

Performance Measure	Code	Number of units to be treated over 10 years using CFLR funds	Number of units to be treated over 10 years using other FS funds	Number of units to be treated over 10 years using Partner Funds¹	CFLR funds to be used over 10 years	Other FS funds to be used over 10 years²	Partner funds to be used over 10 years
Acres treated annually to sustain or restore watershed function and resilience	WTRSHD-RSTR-ANN	80				\$150,000	
Acres of forest vegetation established	FOR-VEG-EST						
Acres of forest vegetation improved	FOR-VEG-IMP	25,626	16,059		\$4,547,622	\$2,901,622	\$646,000
Manage noxious weeds and invasive plants	INVPLT-NXWD-FED-AC	1,931	759	50	\$1,061,772	\$400,000	\$46,000
Highest priority acres treated for invasive terrestrial and aquatic species on NFS lands	INVSPE-TERR-FED-AC	1,931	759	50	\$1,061,772	\$400,000	\$46,000
Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions.	S&W-RSRC-IMP						

Performance Measure	Code	Number of units to be treated over 10 years using CFLR funds	Number of units to be treated over 10 years using other FS funds	Number of units to be treated over 10 years using Partner Funds ¹	CFLR funds to be used over 10 years	Other FS funds to be used over 10 years ²	Partner funds to be used over 10 years
Acres of lake habitat restored or enhanced	HBT-ENH-LAK						
Miles of stream habitat restored or enhanced	HBT-ENH-STRM	4	11	1	\$250,000	\$250,000	\$16,000
Acres of terrestrial habitat restored or enhanced	HBT-ENH-TERR	25,626	16,059		\$4,547,622	\$2,901,622	\$646,000
Acres of rangeland vegetation improved	RG-VEG-IMP						
Miles of high clearance system roads receiving maintenance	RD-HC-MAIN	100	200		\$60,000	\$120,000	
Miles of passenger car system roads receiving maintenance	RD-PC-MAINT	500	1000		\$270,000	\$540,000	
Miles of road decommissioned	RD-DECOM						
Miles of passenger car system roads improved	RD-PC-IMP						
Miles of high clearance system road improved	RD-HC-IMP						
Number of stream crossings constructed or reconstructed	STRM-CROS-MTG-STD						

Performance Measure	Code	Number of units to be treated over 10 years using CFLR funds	Number of units to be treated over 10 years using other FS funds	Number of units to be treated over 10 years using Partner Funds ¹	CFLR funds to be used over 10 years	Other FS funds to be used over 10 years ²	Partner funds to be used over 10 years
to provide for aquatic organism passage			3				
Miles of system trail maintained to standard	TL-MAINT-STD	470	330		\$720,000	\$500,000	
Miles of system trail improved to standard	TL-IMP-STD						
Miles of property line marked/maintained to standard	LND-BL-MRK-MAINT	200	190		\$220,000	\$150,000	
Acres of forestlands treated using timber sales	TMBR-SALES-TRT-AC		450			\$629,000	
Volume of timber sold (CCF)	TMBR-VOL-SLD		18,500			\$730,000	
Green tons from small diameter and low value trees removed from NFS lands and made available for bio-energy production	BIO-NRG						

Performance Measure	Code	Number of units to be treated over 10 years using CFLR funds	Number of units to be treated over 10 years using other FS funds	Number of units to be treated over 10 years using Partner Funds ¹	CFLR funds to be used over 10 years	Other FS funds to be used over 10 years ²	Partner funds to be used over 10 years
Acres of hazardous fuels treated outside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire	FP-FUELS-NON-WUI						
Acres of hazardous fuels treated inside the wildland/urban interface (WUI) to reduce the risk of catastrophic wildland fire	FP-FUELS-NON-WUI						
Acres of wildland/urban interface (WUI) high priority hazardous fuels treated to reduce the risk of catastrophic wildland fire	FP-FUELS-WUI	47,000	20,000		\$2,350,000	\$1,000,000	
Number of priority acres treated annually for invasive species on Federal lands	SP-INVSPFED-AC						
Number of priority acres treated annually for native pests on Federal lands	SP- NATIVE – FED-AC						

Attachment B: Reduction of Wildland Fire Management Cost**R-CAT Wildfire Management Program Cost Analysis**

Proposal Name:

Calendar Years: Start Year and End Year for Treatments

2010

2011

2019

2020

Acre Project Area

Total Treatment Acres

192,000

The average # of years treatments are effective, including the implementation year.

10

6

Percent of Total treatment acres implemented/effective each year

Cumulative Percent of total acres treated/effective

Average Annual Treatment Revenue/Acre

Average Annual Treatment Costs/Acre*

Net Fuel Treatment Costs This Year from Annual Reporting	
Discounted Net Treatment Costs	
Pre Treatment Expected Wildfire Cost, Includes Rehabilitation, Reforestation & BAER Costs	
Discounted Pre Treatment Expected Wildfire Cost, Includes Rehabilitation and BAER Costs	
Post Treatment Expected Wildfire Cost, Includes Rehabilitation, Reforestation & BAER Costs	
Discounted Post Treatment Expected Wildfire Cost, Includes Rehabilitation and BAER Costs	
Expected Wildfire Suppression Cost Savings	
Discounted Pre Trx minus Discounted Post Trx	
Net Change in Wildfire Management Program Costs	
Discounted Net Change in Wildfire Mngmt Program Costs	
Total SCI Annual Cost Expectation Per Year (pre-treatment)	
\$	1,100,000

\$ (6,673,806)

Total Anticipated Fire Program Cost Savings for the Fully Implemented Proposal

2011		2012		2013		2014	
Year 1		Year 2		Year 3		Year 4	
6,700		6,700		6,700		6,700	

\$	1,000,000	\$	1,000,000	\$	975,000	\$	975,000
\$	1,000,000	\$	961,538	\$	901,442	\$	866,771
\$	4,362	\$	8,724	\$	13,086	\$	17,448
\$	6,106	\$	12,212	\$	18,318	\$	24,424
\$	(833,138)	\$	(828,776)	\$	(824,414)	\$	(820,052)
\$	(831,394)	\$	(793,076)	\$	(755,998)	\$	(720,110)

2015	2016	2017	2018
------	------	------	------

Year 5	Year 6	Year 7	Year 8
6,700	6,700	6,700	6,700

	6	6	6	6
	3%	3%	3%	3%
	17%	21%	24%	28%
\$	425	\$ 425	\$ 425	\$ 425
\$	550	\$ 550	\$ 550	\$ 550
\$	837,500	837,500	\$ 837,500	837,500
\$	715,899	688,364	\$ 661,888	636,431
\$	1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000
\$	960,000	\$ 925,000	\$ 900,000	900,000
\$	975,000	\$ 975,000	\$ 975,000	975,000

\$	833,434	\$ 801,379	\$	770,557	\$ 740,920
\$	21,810	\$ 26,172	\$	30,534	\$ 34,896
\$	30,530	\$ 36,636	\$	42,742	\$ 48,848
\$		\$	\$		\$
(815,690)		(811,328)	(806,966)		(802,604)
\$		\$	\$		\$
(685,369)		(651,728)	(619,146)		(587,583)

2019

2020

2021

	Implementation Ends	First Treatment Ineffective
Year 9	Year 10	Year 11
6,700	6,700	-

6

6

3%

3%

0%

31%

35%

31%

\$

425

\$

425

\$

550

\$

550

\$

\$

\$

-

837,500	837,500		
\$	\$		
611,953	588,416	\$	-
\$	\$	\$	
1,100,000	1,100,000	1,100,000	
\$	\$	\$	
875,000	860,000	743,121	
\$	\$		
975,000	975,000		
\$	\$		
712,423	685,022	\$	-
	\$	\$	
\$	39,258	43,620	39,258
	\$	\$	
\$	54,954	61,060	54,954
\$	\$	\$	
(798,242)	(793,880)	39,258	
\$	\$	\$	
(556,999)	(527,356)	54,954	

Attachment C: Members of the Collaborative:

Organization Name	Contact Name	Phone Number	Role in Collaborative
Pisgah National Forest, Grandfather Ranger District	John Crockett	828-652-2144	District Ranger, Attachment F Author
The Nature Conservancy, NC Chapter	David Ray	828-350-1431 ext. 102	Facilitator
WildLaw, Southern Appalachian Office	Josh Kelly	828-779-8273	Biologist, Document Author, Document Editor
North Carolina Wildlife Resources Commission	Gordon Warburton	828-659-7537	Wildlife Biologist, Ecological Context, Treatments Author
North Carolina Division of Forest Resources	Michael Cheek	828-665-8688	CWPP Contact
Western North Carolina Alliance	Bob Gale	828-274-8800	NNIP expert, Treatments Author
Southern Appalachian Forest Coalition	Hugh Irwin	828-252-9223	Hemlock Conservation Planner
National Wild Turkey Federation	Gary Burger	802-637-3106	NWTF
Southern Forest Network	Alyx Perry	828-277-9008	Economic Context Author
Foothills Conservancy	Andrew Kota	828-437-9930	Wilson Creek NNIP
Wild South	Ben Prater	828-258-2667	Project Review
Trout Unlimited	Damon Hearne	828-398-0177	Aquatic Restoration, Economic benefits Author

Attachment D: Letter of Commitment

Grandfather Restoration Collaborative

The undersigned participants pledge their support to ecological restoration of National Forest Lands on the Grandfather Ranger District and surrounding conservation lands. The participants are committed to collaboratively:

- enhancing the health and resilience of the land, waters, forests, human communities, and economy within and surrounding the project area;
- using the best available science and monitoring to inform recommendations, decision-making, and feedback regarding restoration activities;
- recommending and making necessary adaptive management corrections; and
- striving for respectful and effective communication with participants and other individuals and entities encountered as part of this effort.

With the approval of participants, which will not be unreasonably withheld, others may join in this effort if they share the goal and priorities of the Collaborative Forest Landscape Restoration Act under Title IV of the Omnibus Public Lands Management Act of 2009. New participants will execute a copy of this Memorandum of Agreement to indicate their agreement with its provisions.

Decisions to take actions as a group will be made by consensus. If consensus cannot be achieved, decisions will be made by majority vote of the participants including any which have joined as set forth above.

Nothing in this Memorandum of Agreement (MOA) shall bind any participant to the expenditure of funds. Any awarding or contracting for the expenditure of funds shall be pursuant to appropriate separate written agreements.

Nothing in this MOA shall affect or interfere with the fulfillment of the obligations or exercise of authority by any participant, or the taking of actions by any participant to individually further the goals of this MOA.

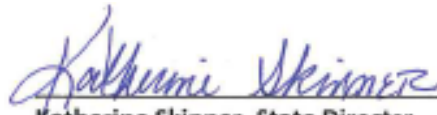
This MOA will become effective upon execution of all participants and remain in effect for three (3) years, and may be renewed for three additional three-year periods. Any participant may withdraw by written notice to the other participants forty five (45) days prior to the withdrawal date.

Effective this 9th day of February, 2011.

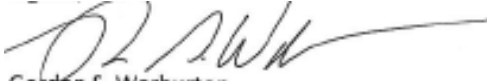


Wib L. Owen
State Forester

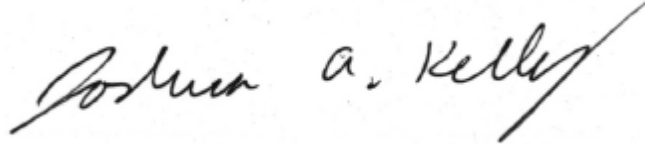
North Carolina Division of Forest Resources



Katherine Skinner, State Director
The Nature Conservancy, North Carolina Chapter




Gordon S. Warburton
Supervising Wildlife Biologist
North Carolina Wildlife Resources Commission



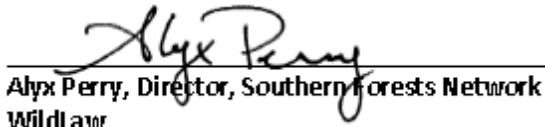
Joshua A. Kelly
Biologist, Wildlaw



Robert K. Abernethy, Assistant Vice President of
Agency Programs, Natl. Wild Turkey Federation



Hugh Irwin
Program Director; Conservation Planner
Southern Appalachian Forest Coalition



Alyx Perry, Director, Southern Forests Network
WildLaw



Susie Hamrick Jones
Executive Director, Foothills Conservancy



Ben Prater
Associate Director, Wild South



Bob Gale, Ecologist
Western North Carolina Alliance



Damon Hearne, Southeastern Land Protection
Coordinator, Trout Unlimited

Attachment E: Predicted Jobs Table from Treat Spreadsheet:

	Employment (# Part and Full-time Jobs)			Labor Inc (2009 \$)		
	Direct	Indirect and Induced	Total	Direct	Indirect and Induced	Total
Commercial Forest Products						
Sawmills	0.1	0.1	0.2	3,533	4,063	7,596
Plywood and Veneer Softwood	0.0	0.0	0.0	677	1,232	1,909
Plywood and Veneer Hardwood	-	-	-	-	-	-
Oriented Strand Board (OSB)	-	-	-	-	-	-
Mills Processing Roundwood Pulp Wood	0.1	0.3	0.4	6,972	13,852	20,794
Other Timber Products	0.0	0.0	0.1	1,203	1,898	3,102
Facilities Processing Residue From Sawmills	0.0	0.0	0.0	362	717	1,078
Facilities Processing Residue From Plywood/Veneer	-	-	-	-	-	-
Biomass–Cogen	-	-	-	-	-	-
Total Commercial Forest Products	0.2	0.5	0.7	12,716	21,763	34,479
Other Project Activities						
Facilities, Watershed, Roads and Trails	0.0	0.0	0.0	0.0	0.0	0.0
Abandoned Mine Lands	0.0	0.0	0.0	0.0	0.0	0.0
Ecosystem Restoration, Hazardous Fuels, and Forest Health	3.9	0.8	4.7	125,824.1	0.0	0.0
Thinning and Biomass	0.0	0.0	0.0	297.6	33,796.4	159,620
Commercial Firewood	0.2	0.0	0.2	297.6	181.3	478.9
Contracted Monitoring	0.2	0.2	0.4	14,528	10,002.8	24,531
FS Implementation and Monitoring	5.5	1.2	6.7	113,323	49,666	162,988
Total Other Project Activities	4.2	1.0	5.2	140,650	43,980	184,631
Total All Impacts	9.9	2.8	12.7	\$266,690	\$115,409	\$382,098

Attachment F: Funding Estimates

Funding Estimate FY 2011	
Fiscal Year 2011 Funding Type	Dollars/Value Planned
1. FY 2011 Funding for Implementation	\$583,524
2. FY 2011 Funding for Monitoring	\$64,500
3. USFS Appropriated Funds	\$506,024
4. USFS Permanent & Trust Funds	
5. Partnership Funds	\$39,000
6. Partnership In-Kind Services Value	\$59,700
7. Estimated Forest Product Value	
8. Other (specify)	
9. FY 2011 Total (total of 1-6 above for matching CFLRP request)	\$604,724
10. FY 2011 CFLRP request (must be equal to or less than above total)	\$604,724
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2011 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2012	
Fiscal Year 2012 Funding Type	Dollars/Value Planned
1. FY 2012 Funding for Implementation	\$512,333
2. FY 2012 Funding for Monitoring	\$56,000
3. USFS Appropriated Funds	\$388,300
4. USFS Permanent & Trust Funds	
5. Partnership Funds	\$43,000
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$40,333
8. Other (specify)	
9. FY 2012 Total (total of 1-6 above for matching CFLRP request)	\$528,333
10. FY 2012 CFLRP request (must be equal to or less than above total)	\$528,333
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2012 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2013	
Fiscal Year 2013 Funding Type	Dollars/Value Planned
1. FY 2013 Funding for Implementation	\$461,833
2. FY 2013 Funding for Monitoring	\$51,000
3. USFS Appropriated Funds	\$377,800
4. USFS Permanent & Trust Funds	
5. Partnership Funds	\$3,000
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$40,333
8. Other (specify)	
9. FY 2013 Total (total of 1-6 above for matching CFLRP request)	\$477,833
10. FY 2013 CFLRP request (must be equal to or less than above total)	\$477,833
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2013 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2014	
Fiscal Year 2014 Funding Type	Dollars/Value Planned
1. FY 2014 Funding for Implementation	\$463,733
2. FY 2014 Funding for Monitoring	\$51,000
3. USFS Appropriated Funds	\$379,700
4. USFS Permanent & Trust Funds	
5. Partnership Funds	\$3,000
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$40,333
8. Other (specify)	
9. FY 2014 Total (total of 1-6 above for matching CFLRP request)	\$479,733
10. FY 2014 CFLRP request (must be equal to or less than above total)	\$479,733
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2014 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2015	
Fiscal Year 2015 Funding Type	Dollars/Value Planned
1. FY 2015 Funding for Implementation	\$412,133
2. FY 2015 Funding for Monitoring	\$46,000
3. USFS Appropriated Funds	\$335,100
4. USFS Permanent & Trust Funds	
5. Partnership Funds	\$3,000
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$33,333
8. Other (specify)	
9. FY 2015 Total (total of 1-6 above for matching CFLRP request)	\$428,133
10. FY 2015 CFLRP request (must be equal to or less than above total)	\$428,133
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2015 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2016	
Fiscal Year 2016 Funding Type	Dollars/Value Planned
1. FY 2016 Funding for Implementation	\$412,833
2. FY 2016 Funding for Monitoring	\$42,000
3. USFS Appropriated Funds	\$332,800
4. USFS Permanent & Trust Funds	
5. Partnership Funds	
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$33,333
8. Other (specify)	
9. FY 2016 Total (total of 1-6 above for matching CFLRP request)	\$422,833
10. FY 2016 CFLRP request (must be equal to or less than above total)	\$422,833
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2016 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2017	
Fiscal Year 2017 Funding Type	Dollars/Value Planned
1. FY 2017 Funding for Implementation	\$413,533
2. FY 2017 Funding for Monitoring	\$42,000
3. USFS Appropriated Funds	\$333,500
4. USFS Permanent & Trust Funds	
5. Partnership Funds	
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	\$33,333
8. Other (specify)	
9. FY 2017 Total (total of 1-6 above for matching CFLRP request)	\$423,533
10. FY 2017 CFLRP request (must be equal to or less than above total)	\$423,533
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2017 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

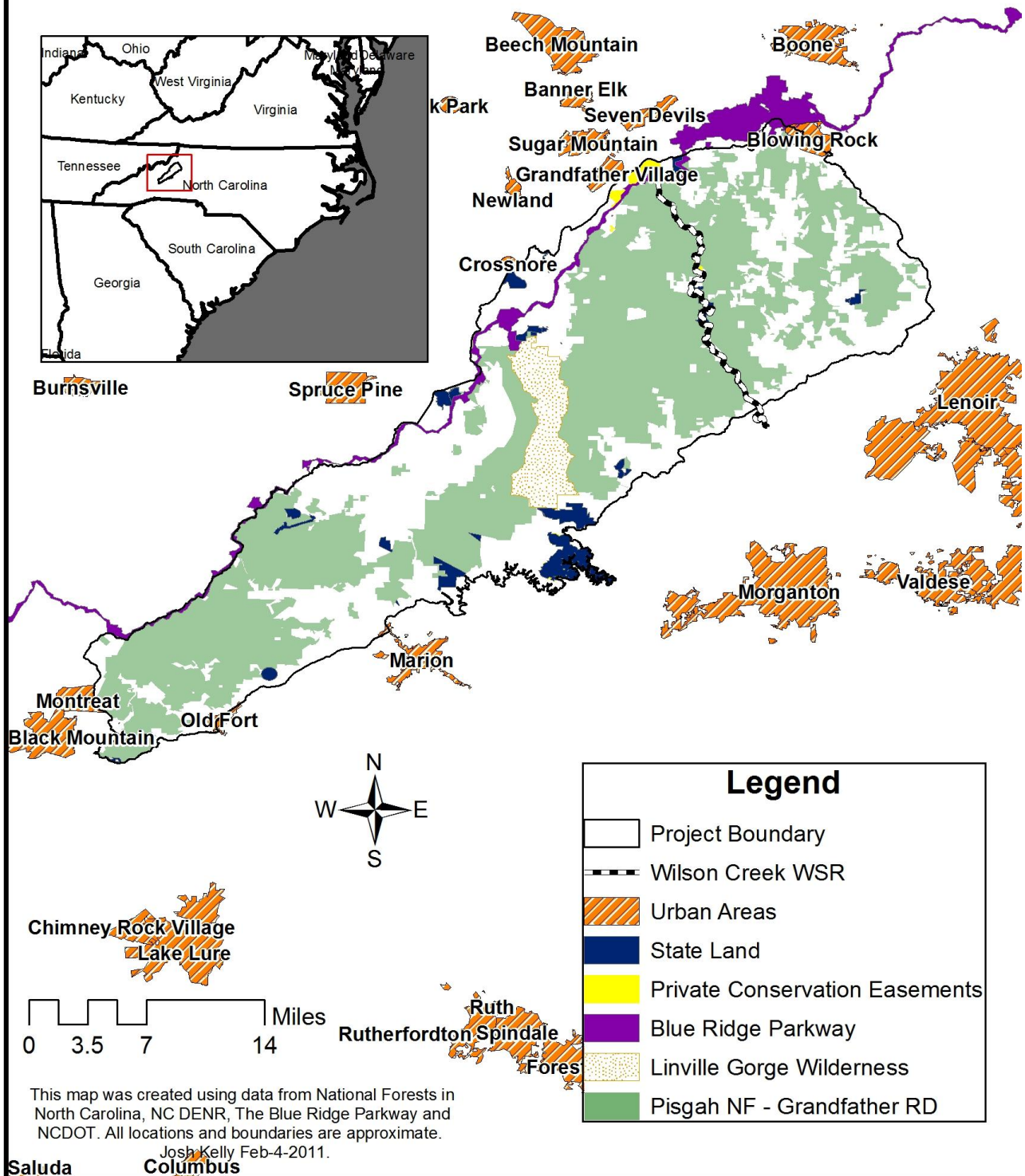
Funding Estimate FY 2018	
Fiscal Year 2018 Funding Type	Dollars/Value Planned
1. FY 2018 Funding for Implementation	\$381,000
2. FY 2018 Funding for Monitoring	39,000
3. USFS Appropriated Funds	\$334,300
4. USFS Permanent & Trust Funds	
5. Partnership Funds	
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	
8. Other (specify)	
9. FY 2018 Total (total of 1-6 above for matching CFLRP request)	\$391,000
10. FY 2018 CFLRP request (must be equal to or less than above total)	\$391,000
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2018 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Funding Estimate FY 2019	
Fiscal Year 2019 Funding Type	Dollars/Value Planned
1. FY 2019 Funding for Implementation	\$381,700
2. FY 2019 Funding for Monitoring	39,000
3. USFS Appropriated Funds	\$335,000
4. USFS Permanent & Trust Funds	
5. Partnership Funds	
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	
8. Other (specify)	
9. FY 2019 Total (total of 1-6 above for matching CFLRP request)	\$391,700
10. FY 2019 CFLRP request (must be equal to or less than above total)	\$391,700
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2019 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

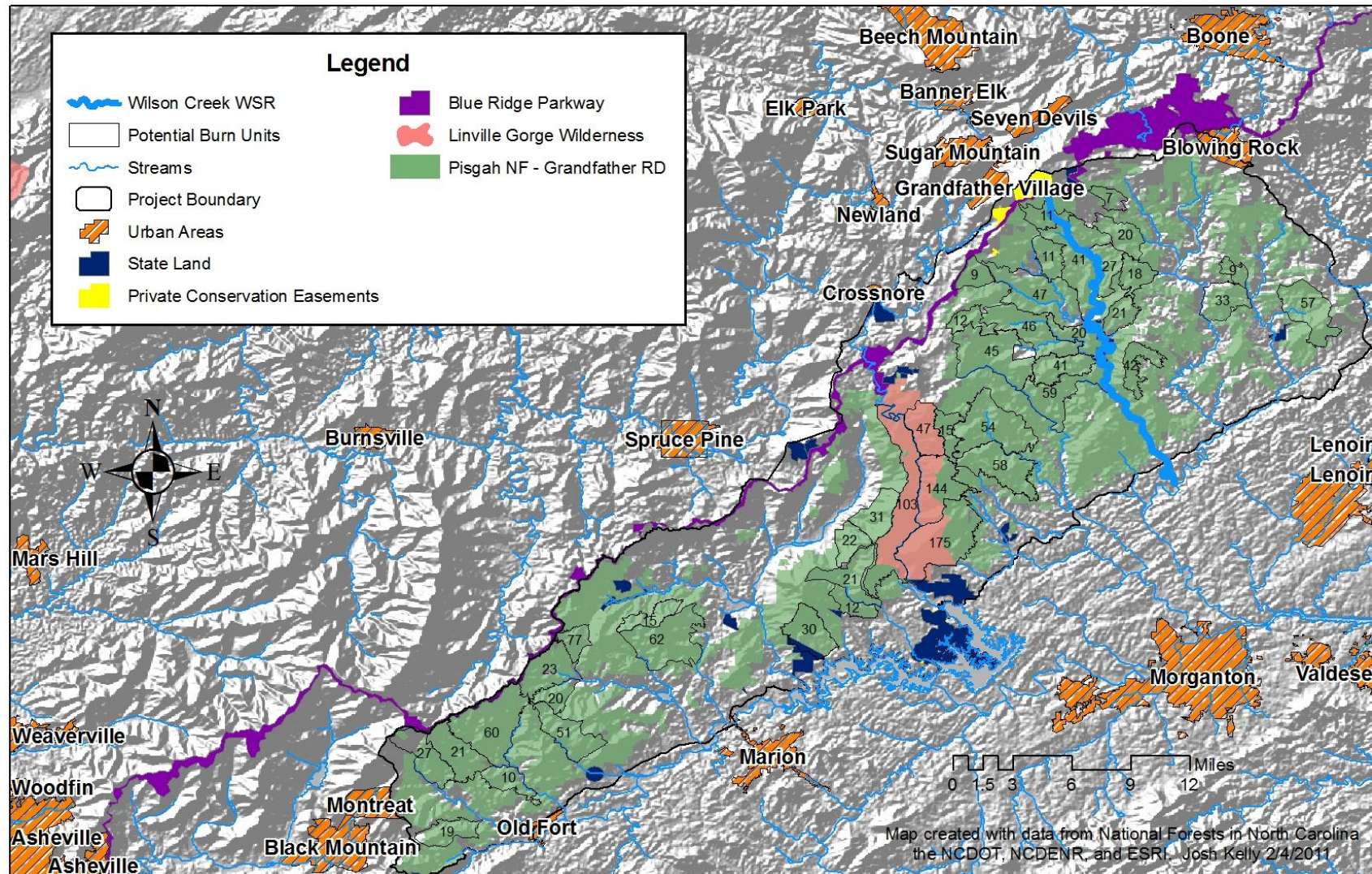
Funding Estimate FY 2020	
Fiscal Year 2020 Funding Type	Dollars/Value Planned
1. FY 2020 Funding for Implementation	\$389,700
2. FY 2020 Funding for Monitoring	40,000
3. USFS Appropriated Funds	\$343,000
4. USFS Permanent & Trust Funds	
5. Partnership Funds	
6. Partnership In-Kind Services Value	\$56,700
7. Estimated Forest Product Value	
8. Other (specify)	
9. FY 2020 Total (total of 1-6 above for matching CFLRP request)	\$399,700
10. FY 2020 CFLRP request (must be equal to or less than above total)	\$399,700
Funding off NFS lands associated with proposal in FY 2010 (does not count toward funding match from the Collaborative Forested Landscape Restoration Fund)	
Fiscal Year 2020 Funding Type	Dollars Planned
11. USDI BLM Funds	
12. USDI (other) Funds	
13. Other Public Funding	
Private Funding	

Attachment G: Maps

Grandfather CFLR Project: Overview



Grandfather Project: Potential Burn Units with Ecological Score



Grandfather Project: Fire Adapted Vegetation Types

